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TECHNICAL NOTE

U.S. DEPARTMENT OF THE INTERIOR – BUREAU OF LAND MANAGEMENT

COAL RIVER

AN EDUCATIONAL ALTERNATIVE FUTURES
WILDLAND AND RESOURCE MANAGEMENT PLANNING GAME

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WILDLAND AND RESOURCE MANAGEMENT PLANNING GAME

ERIC L. STONE

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CONTENTS

	PAGE
INTRODUCTION	1
PLAYING THE GAME	3
COAL RIVER, AN ALTERNATIVE FUTURES PLANNING GAME	5
COMPETING USES OF THE LAND	5
PHYSICAL CHARACTERISTICS	6
ALTERNATIVE FUTURE SCENARIOS	7
RULES	10
CURRENT SITUATION INSTRUCTIONS	13

USDI, BUREAU OF LAND MANAGEMENT
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INTRODUCTION

Alternative futures planning is the generic name for a number of planning approaches¹ which recognize that the future is uncertain and that there is not one future, but rather a variety of possible futures, any one of which may occur. The Coal River game presented here is a version of a game "Mystic Mountain," developed by USDA, Pacific Southwest Forest and Range Experiment Station. Mystic Mountain is described as an educational game which teaches wildland planners and managers important concepts in alternative futures planning while they attempt to manage a hypothetical national forest for 75 years (five 15-year periods). Coal River builds on this basic concept, however instead of having competing uses of camping, primitive recreation activities, skiing, timber production, and spiritual values, this game deals with managing (1) coal mining by surface methods, (2) primitive recreation activities, (3) camping, (4) river floating and, (5) domestic livestock and wild horse forage production. The game is played for five 10-year periods, in which the players attempt to meet different competing use production targets under various alternative future scenarios.

Both Coal River and the Mystic Mountain game attempt to teach several important concepts from alternative futures planning which could be adapted to a wide variety of planning processes. Mystic Mountain describes these concepts as follows:

1. There are alternative futures, which place different demands on land managers. In the Mystic Mountain and Coal River games, a set of believable scenarios--short word pictures of the future--describe alternative conditions under which the players may have to manage the land. A different set of demands has been developed for each scenario. Because the players do not know which of the futures will occur, yet must be prepared to meet the demands of any future, the players are forced into planning for a range of alternative futures.

2. The preservation of options is important. The goal of the players is to manage the land, meeting the demands of the scenarios that occur. Because it is impossible to meet all the demands of all the scenarios simultaneously, the players soon discover that
 - (a) The management activities they choose foreclose future options and their ability to meet the demands of the scenarios.

 - (b) Some activities in some locations foreclose more options than others.

 - (c) A careful choice of activities will preserve enough options to meet the demands.

 - (d) It is sometimes important to delay a decision about the use of a prime site, because the demands of the different possible futures would dictate different uses.

¹For one such approach see Creighton, James L., 1976, Alternatives Futures Planning, Div. of Planning Coordination, Bur. Reclam., U.S. Dep. of Inter., Denver, Colo. 141 p.

3. Some activities actually create future options. Through proper sequencing, the same piece of land can provide many seemingly conflicting outputs over time. For example, no one wants to camp in the middle of a recently mined, or reclaimed area, yet that same area can be the site of a beautiful campground 15-20 years after mining. Therefore, the game requires a delay between seriously conflicting uses of the same land. Players who put off decisions too long find themselves unable to schedule a second use of a site. Where conflicting uses must be spread out over time, the failure to act may eliminate the choice of providing both uses.

4. Meeting the demands faced by wildland management organizations requires careful, long-range planning. At the beginning of a game the players find themselves responsible for meeting these demands for a period of 50 years. They must meet the demands of today, but they also must be prepared to meet the demands of tomorrow. By following the same piece of land through 50 years, they experience at firsthand the rewards of careful planning and the punishments of inadequate planning.

Although the game is complete by itself, it is most educational when used as part of a workshop or training session. A suitable training session format includes a presentation of the concept of alternative futures and scenarios, and a discussion of the types of scenarios that may influence future wildland management. The discussion is followed by the game, which teaches planning and management concepts, and then by a discussion of the game. This format leaves a couple of hours in the afternoon for additional training or discussion of related subjects.

PLAYING THE GAME

The instructor or workshop leader should act as the game leader. After introducing the game, the leader divides the players into teams of two or three people.

Each team is given a copy of the game description, five copies of the Coal River map, and colored pencils for filling in the maps. Any number of teams can play at one time, but if there are more than five teams the leader should probably have help. One assistant for every five additional teams is needed to answer questions, assure that the rules are being followed, check the maps, and lead group discussions.

The game is conducted during five periods, each one representing 10 years of elapsed time. The first period should last one hour, and all subsequent periods 30 minutes.

At the beginning of each time period, the leader reads the current situation description for that period. This tells the players what has occurred in the world during the last 10 years, what scenario they can expect for the next 10 years, and thus what are the minimum output levels they must provide. The current situation description provided has been chosen to emphasize the teaching points discussed earlier, but alternative current situation descriptions could be easily prepared.

Next, each team examines the productivity information and rules included in the game description. The team members decide where to build campgrounds, mine coal, preserve in a natural state, and so on, during that time period, in order to meet the demands of the current situation. The locations chosen are entered on a copy of the Coal River map, using the appropriate color codes.

For all periods except the last, once the decisions are recorded, someone in the team should copy the information onto another copy of the map as existing uses, to be used during the next period. The earlier map is then given to the leader to be checked. For consistency, when coloring the maps, all teams should use the same color codes (as shown on map, or as decided by the leader), should indicate old or existing uses at the beginning of a period with appropriately colored diagonal lines on the map for that period, and should use solid colors for uses added during that period. The leader should check the completed maps for errors during the next time period, and then return them to the teams. Any errors should be immediately reported to the team for correction before that team prepares its map for the next period.

After all five time periods have been played, one member of each team is asked to present an account of what the team did and why they were or were not able to win. The leader should steer the discussion to the teaching points presented earlier, if these do not arise naturally, and

should encourage the players to discuss how their strategies and game experiences related to these points. This is also an ideal time to discuss the implications of the game for the players' roles in wildland planning and management.

The following section describes the game. A copy of these pages is given to every team. Duplicate pages for copying are provided.

COAL RIVER: AN ALTERNATIVE FUTURES PLANNING GAME

This game is designed to simulate the management of the Coal River Resource Area for a period of 50 years. You are a member of the management team.

The Coal River Resource Area consists of an undeveloped portion of the Coal River and a block of adjacent public land. Coal River is regionally significant as an undeveloped, mostly wild and moderately scenic river. The steep, eroded river "breaks" create a feeling of isolation and make the river valley a unique geographic feature within the region.

The problem of managing the Coal River Resource Area is uncertainty about what it should be managed for. A number of competing uses of the land are possible, and it is presently very difficult to predict which demands upon the land will be of greatest importance in future years.

Competing Uses of the Land

1. Coal Mining by Surface Methods--There is a considerable amount of known recoverable coal resources within the unit. All coal will be mined by surface mining methods, the most suitable method for the resources and overburden present.

As you begin this exercise, the Department of the Interior has just approved a mining plan on a previously leased 1,000 acres of coal (as shown by hatching) in the sagebrush ecotype. Coal underlies the entire planning unit; however, the riverbreaks and river bottoms have been found unsuitable for surface mining under the Surface Mining Control and Reclamation Act (Sections 512 and 513). The mountain foothills have problems with reclamation which are under a 10-year study. Long range coal demand is expected to increase, but the target for this region is uncertain. If new Bureau of Land Management coal leases are issued, they are expected to be immediately adjacent to one another and the existing mine.

Current technology indicates the entire 1,000 acres will be mined in 10 years. Complete reclamation will occur in the following 10 years and may be followed by any of the former uses for that ecosystem except primitive recreation.

2. Primitive Recreation Activities--Because the Coal River area is quite famous, there is strong demand for dispersed recreation activities (such as hiking, backcountry camping, and hunting) in a primitive setting. The demand for this type of recreation has grown dramatically during the last 10 years, and may continue to do so.

3. Camping--There is also a great demand for campgrounds, often by persons using campers and trailers. Coal River is just a few miles off the main north-south highway in the state, so there has been a steady increase in demand for developed camping sites.

4. River Floating--There is also a growing demand for river floating opportunities. The river is a prehistoric and historic travel route and remains relatively unchanged and undeveloped, thus providing a special type of primitive/wilderness experience.

5. Domestic Livestock and Wild Horse Forage Production--There has been historic use of the entire area for domestic livestock forage and a 100 head herd of wild horses. The range condition and trend varies by ecological land unit.

Physical Characteristics

The resource area is divided into five ecological land units, each of which has different use characteristics.

AREA 1 - RIVER BOTTOMS

13,000 acres. This is the area of greatest conflict. It is a potential wild and scenic river and/or wilderness designation area. It has excellent camping and primitive recreation potential and the only river floating potential. Although the area is underlain by strippable coal, it is considered unsuitable for mining by surface methods.

AREA 2 - RIVER BREAKS

23,000 acres. Good primitive recreation potential. Modest grazing and camping potential. Although the area is underlain by strippable coal, it has been designated as unsuitable for surface mining.

AREA 3 - GRASSLANDS

25,000 acres. Good grazing potential, modest primitive recreation, limited potential for suitable camping. Modest coal resources but excellent reclamation potential. Suitable for surface mining.

AREA 4 - SAGEBRUSH

20,000 acres. Moderate grazing potential, modest primitive recreation, limited potential for suitable camping. Good coal resources and good reclamation potential. Suitable for surface mining.

AREA 5 - MOUNTAIN FOOTHILLS

19,000 acres. Modest grazing potential, good primitive recreation and camping potential. Very good coal resources are overlain by a surface with unknown reclamation potential. A current study will determine suitability for surface mining.

Quantitative descriptions of the productivity of each of these units are given in Table 1.

Alternative Future Scenarios

A team of Resource Area personnel, researchers, and consultants have identified a set of four scenarios--short word pictures of the future--which portray the most likely conditions under which the land will be managed over the next 50 years. These scenarios are summarized below.

1. An Energy Crisis--A major fuel shortage severely restricts use of the private automobile. Fuel is available for public transportation on a priority basis. At Coal River, restrictions on use of private automobiles would greatly reduce the amount of summer recreation (both primitive and developed camping) as well as travel to the area for river floating. Since Coal River is a few miles from the railroad, possibly weekend and summer rail transportation could be arranged for recreationists, but certainly recreation use would not continue to grow at its present rate. With recreation use significantly reduced, the land could be managed for increased grazing. The energy shortage would significantly increase the demand for additional coal. The effects of a fuel shortage are estimated to last for approximately 20 years, at which time it is assumed other energy sources will have been developed.

2. Continued Growth in Mass Recreation--The current trends of expansion in demand for recreation opportunities are assumed to continue. In particular there are demands for large increases in wild horse herd observation and camp sites, with some increased demand for primitive recreation activities and river floating. There is considerable development of second homes and condominiums on adjoining land. Recreation and tourism become more important than livestock grazing in the local economy. There is also an increasing demand for resource area coal.

3. Technological Advance, Primitive Recreation Activities and River Floating--A major values shift has occurred, so that Americans are now placing greater emphasis on environmental values, with a down-playing of material values. The result is a great increase in demand for primitive recreation activities, and a modest increase in camping. Technological advances plus increased conservation has stabilized the demand for resource area coal. A decrease in the consumption of red meat has resulted in lower demands for forage for domestic livestock.

4. Slow Growth, Continued Mass Recreation, Beef Shortage--Coal mining grows slowly. There is an increased demand for beef forage and a reduction in wild horse interest (and herd size). Mass recreation expands rapidly, and hunting pressure keeps the demand for primitive areas high. River floating grows slowly.

NOTE: Any of the scenarios may occur initially. The likelihood of an energy crisis occurring decreases sharply after the first 20 years. Because the future is uncertain, it is highly desirable to manage the land in such a way that options are preserved so that in the future the land can be managed in response to any of the scenarios.

Minimum output requirements for each scenario are shown for each 10-year period on Table 2. Requirements vary according to scenario, by period.

Table 1. Productivity of Areas of the Resource Area, According to Use

Area (acres)		Camping	Primitive Recreation Activities	River Floating	Grazing AUMs yr/ 1000 ac	Million tons of Coal/ 1000 ac
		Visitor days/1000 acres/year				
1	13,000	8,000	2,000	2,000	1,000	unsuitable
2	23,000	2,000	1,000	-	100	unsuitable
3	25,000	500	500	-	500	30
4	20,000	500	500	-	300	40
5	19,000	4,000	1,000	-	200	50*

*Not available until study determines reclamation potential.

Table 2. Minimum Output Requirements by Scenario and Time Period of Play

Scenario And Period	Camping Thousand	Primitive	River	Animal Unit Months		Coal Production Mil. tons/period
		Recreation Activity visitor days/year	Floating days/year	Domestic Livestock AUM/year	Wild Horses AUM/year	
All						
Period 1	16	20	4	30,000	1,000	40
I. Energy Crisis						
Period 2	12	15	3	31,000	1,000	120
3	12	17	4	32,000	1,000	140
4	16	19	5	33,000	1,000	160
5	20	21	6	34,000	1,000	180
II. Continued Growth in Mass Recreation						
Period 2	20	22	5	30,000	1,500	60
3	24	24	6	29,000	2,000	80
4	29	27	7	28,000	2,500	100
5	35	30	8	26,000	2,500	120
III. Tech. Advance Primitive Rec.						
Period 2	18	27	8	30,000	1,000	60
3	20	33	12	30,000	1,000	80
4	24	40	16	29,000	1,000	60
5	28	47	20	28,000	1,000	60
IV. Beef Shortage Slow Growth						
Period 2	20	25	5	31,000	1,000	60
3	24	30	6	32,000	800	80
4	29	35	7	33,000	600	100
5	35	40	8	34,000	500	120

RULES

Object - The object of the game is to manage the Coal River Resource Area for a total of 50 years, meeting the minimum output requirements for each 10-year period, regardless of which scenario occurs. The game is played against these standards, so that none, a few, or all of the teams could win.

Materials - Each team is given five maps of the resource area, productivity information for the area, a table of minimum outputs required for each period under several possible future scenarios, and colored pencils to mark the location of management activities on the map.

Play - There are five time periods of play each representing 10 years. At the beginning of each time period, the leader of the game will indicate which scenario and minimum output levels are in force for the next 10 years. Each team then examines the options and indicates the location of management activities needed to meet the output requirements. If the team cannot meet all of the output targets, it should attempt to identify what previous actions or situations prevented it from reaching the targets for later discussion. Even if a team is unable to meet all the targets in one time period, it should continue to play the game in future time periods, taking advantage of options that open up over time and hoping for a change in scenarios.

Note: The minimum output levels for each separate scenario can be reached, although some require a careful sequencing of activities. The ability to respond to changing scenarios during the play of the game depends on a combination of foresight and luck. Teams which take the time to develop long-range management plans should have an advantage.

At the end of each time period, the game leader collects the maps containing that period's activities and checks them for errors. Thus, toward the end of each period except the last, someone on each team must prepare the map to be used during the next period by copying all existing uses--including those begun in this period--onto a fresh copy of the map. The first time period will be 1 hour long, and the others will last 30 minutes.

Restrictions - In an effort to reflect reality and keep the problem simple enough to be solved in a limited time, certain basic rules for each kind of management activity have been formulated.

Campgrounds

1. No campground can be built on a site that has been mined in the immediately preceding time period.

2. Once a campground is built, it must be operated as a campground for two periods before it can be used for another purpose due to the initial expense of building the campground.

Primitive Recreation Activities

1. Land which has been managed for primitive recreation activities can be diverted to other uses at any time.
2. No land may be used for primitive recreation activities if it has been previously mined at any time during the game.
3. A campground must have been closed and left idle for one time period before that land becomes suitable for primitive recreation activities.

River Floating

1. Only those 1000 acre blocks of river bottom (Area 1) meadows with actual major river in them are capable of river floating visitor day production.
2. Land previously a campground must have been idle of at least one time period before it provides high river floating quality.
3. River floating blocks can concurrently provide intensive recreation (camping); however, the floating experience will be reduced to a moderate (1/2 of normal) level.
4. Grazing for domestic livestock or wild horses reduces floating quality to a moderate level. River bottom/meadows which have been grazed must have been left idle for at least one time period before it provides high floating value.
5. In meeting floating demand, 2 acres of medium value are equivalent to one acre of high floating value.

Domestic Livestock and Wild Horses

1. All grazing leases are for a 10-year period with the Resource Area Manager reserving the authority to not renew leases.
2. Trailing through a non-grazed area is permissible, so grazed areas need not be contiguous.
3. Adequate water is assumed to be available in all 1000 acre blocks.
4. Fences may be built and removed at the beginning and end of each use-period in order to facilitate other uses. Recreation and mining areas (active and under reclamation) are assumed to be fenced.
5. Domestic livestock are incompatible with primitive recreation, but wild horses are considered part of the primitive experience.

Coal Mining

1. All coal mining is by surface mining methods and will (ordinarily) be completed in a 10-year period, immediately followed by reclamation and then be available for subsequent, compatible uses.

2. Areas 3 and 4 are entirely suitable for surface mining, and areas 1 and 2 are entirely unsuitable for surface mining at the beginning of the game. Area 5 is under study during period 1 to determine reclamation potential and suitability.

3. All mining activity must be contiguous to the existing approved lease or its extensions due to the transportation system constraints (not shown on map).

4. Excess capability for coal production from one period may be carried into the next period.

Table 3. Use Restrictions During the Game

Use	Effect on Other Uses of the Same Land During Later Periods of the Game					
	Coal Production	AUM Livestock	AUM Wild Horses	Camping	Primitive Recreation	River Floating
Coal Production	--	Wait one period for reclamation	Wait one period for reclamation	Wait one period for reclamation	Option foreclosed	Unsuitable --not in conflict
AUM Production Livestock	No effect	--	Compatible	No effect	Wait one period	Reduces level by 1/2 one period
AUM Production Wild Horses	No effect	Compatible	--	Incompatible Concurrently		
Camping	Wait two periods	Wait two periods (during use)	Wait two periods (during use)	--	Wait 3 periods, last one with land idle	Reduces high value to medium if at same time
Primitive Recrea.	No effect	No effect	No effect	No effect	--	Reduces level by 1/2 if at same time
River Floating	Unsuitable not in conflict	No effect	No effect	No effect	Reduces level by 1/2 if at same time	--

Current Situation Instructions

Leader - At the beginning of each time period during the play of the game, read the current situation for that period. For your use in checking the completed maps after each period, a summary of required minimum outputs is given in Table 4.

Period 1

You are the managers of the Coal River Resource Area. The only existing commitment of land at this time is the 1000 acre coal lease in land type 4 as shown on your map. You may place all other activities and facilities anywhere you wish in the unit, consistent with the rules. For minimum output levels you must provide, refer to Table 2. In one hour, I will collect the maps you have prepared showing the location of activities and facilities. At that time I will tell you which of the scenarios is occurring and, therefore, what your required minimum output levels for the next period will be. Don't forget to copy the locations from your period 1 map onto your period 2 map as existing facilities before you give me your first map.

Period 2

Ten years have now passed. Disruptions in the world supply of oil and natural gas have created a genuine energy crisis. For the next 10 years, you should provide the minimum output levels listed in Table 2 under the Energy Crisis scenario, Period 2. The mountain foothills baseline study has indicated that the area is reclaimable, is suitable for surface mining, and is now available for immediate mining. You have one-half hour to prepare your maps for this and all future time periods.

Period 3

You are now 20 years into managing the Coal River Resource Area. The energy crisis is still with us although intensive research is underway to reduce energy demand and develop alternative energy sources. At the same time, there has been a massive growth in mass recreation (scenario 2). Thus, for the next 10 years you must manage the Coal River Resource Area in order to meet the demands of both scenarios 1 and 2. That is, for each output you should compare the minimum requirements for the third period in each scenario and produce whichever amount is higher. You have 20 minutes to complete your maps.

NOTE: At this point, we have played a small trick on the players by giving the demands of two scenarios to satisfy when they were only warned to expect one. This should help the players to realize that the scenarios need not be mutually exclusive in real life, and that even the uncertainties are uncertain.

Period 4

The technological research efforts of the past 20 years have resulted in major advances in energy savings. At the same time the public attitudes towards recreation have shifted from mass recreation to primitive, dispersed recreation. For the next time period, you should meet the minimum output levels of Scenario 3, Period 4.

Period 5

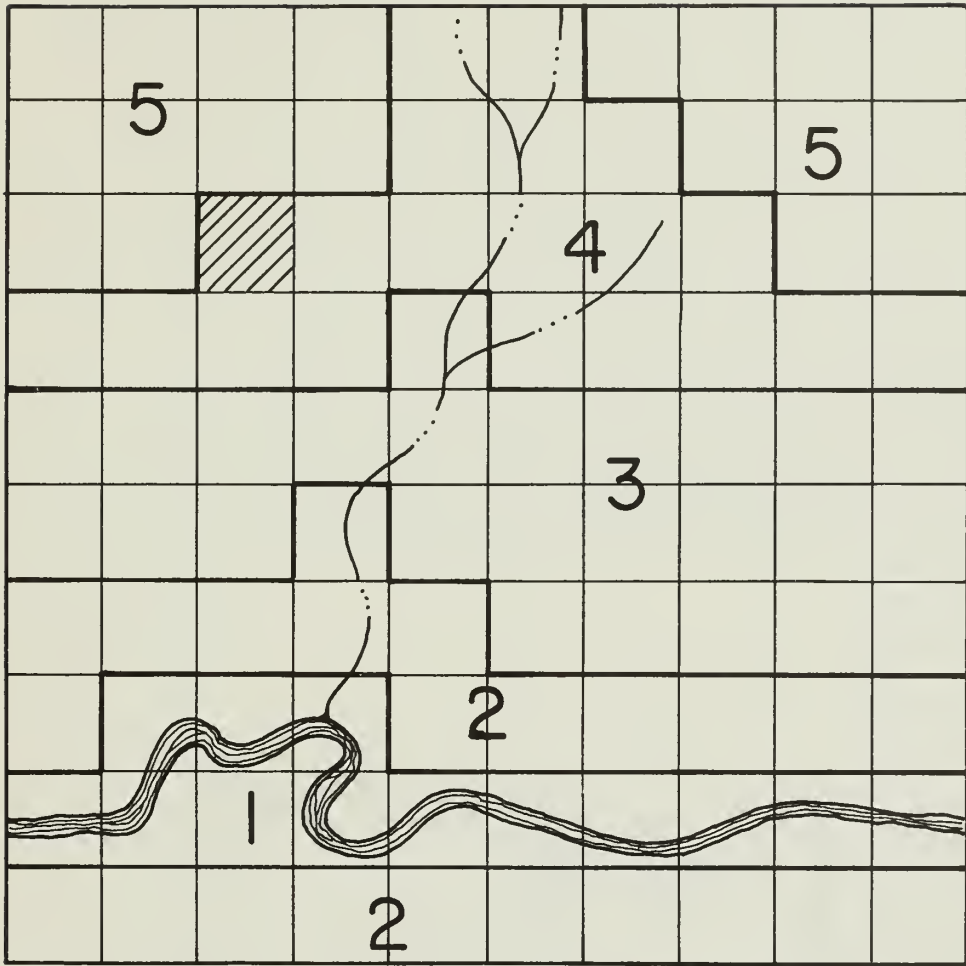
The primitive recreation emphasis continues. Finish the game by meeting the required output levels for Scenario 3, Period 5.

Table 4. Current Situation Minimum Output Requirements

Period	Scenario	Camping 1000	Primitive	River	Animal Unit Months		Coal
			Recreation 1000 Visitor Days/Year	Floating Days/Year	Dom. Livestock AUM/Year	Wild Horses Months	Production Mil Tons/Period
1	All	16	20	4	30,000	1,000	40
2	1	12	15	3	31,000	1,000	120
3	1 or 2	20	22	5	32,000	2,000	140
4	3	24	40	16	29,000	1,000	60
5	3	28	47	20	28,000	1,000	60

NOTE: 2 acres of medium river floating or primitive recreation value is equal to 1 acre of high value.

COAL RIVER RESOURCE AREA



Team _____

Period _____

COLOR CODE

OUTPUT

- green - Livestock grazing
- red - Primitive recreation
- yellow - Camping
- blue - River floating
- brown - Coal mining
- Existing use
- New use

	Required	Produced
1.	_____	_____
2.	_____	_____
3.	_____	_____
4.	_____	_____
5.	_____	_____

Note: Add orange vertical lines in areas where forage is allocated to horses.

Note: Each square = 1000 acres.

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